

WHAT IS CLAIMED IS:

1. A system for providing item recommendations, comprising:  
a memory;  
a device, responsive to a user request, for recording an item on a hardcopy medium;  
5 a processor, for storing ratings of items and for generating recommendations for new items based on recommendation criteria;  
wherein, responsive to the user request, the processor stores an implicit rating for the requested item in the memory, determines whether, based on the implicit rating and the recommendation criteria, to generate an item recommendation, and if the criteria for  
10 generating a recommendation is met, generates a recommendation of a new item.

2. The system of claim 1, wherein the processor further stores a representation of the recorded item in the memory.

3. The system of claim 2, wherein the representation is selected from the group consisting of a representation of the entire recorded item, a thumbnail image of the recorded item, a set of item attributes and a characterization of the recorded item's content.

4. The system of claim 1, wherein the memory stores user profiles for users of the system, wherein each user profile includes a set of user preferences pertaining to items and wherein the processor, responsive to the user request, updates the user's profile with the implicit rating.

5. The system of claim 4, wherein the processor further stores a representation of the recorded item in memory and determines an item similarity for the recorded item.

6. The system of claim 5, wherein the item similarity comprises an item to item similarity is determined by comparing the stored representation of the recorded item with the stored representations of other recorded items stored in the memory.

7. The system of claim 5, wherein the item similarity comprises an item to user similarity which is determined by comparing the stored representations of the user's recorded items with the stored representations of other recorded items stored in the memory.

5        8.        The system of claim 4, wherein the processor determines a user to user  
similarity for the user by comparing the user's profile with the other user profiles stored in  
the memory.

9. The system of claim 4, wherein the processor updates the user's profile by  
10 determining how often the user records items having a similar item similarity and further  
stores the updated user profile in the memory.

10. The system of claim 6, wherein the processor characterizes content of the recorded item using linguistic tools and wherein the processor determines the item to item similarity between two recorded items by calculating a sum of weights of keywords in common divided by a sum of weights of all keywords associated with the two recorded items.

11. The system of claim 4, wherein the processor, responsive to the user's request, stores a record of a user ID, a record of an item ID and a time stamp.

12. The system of claim 4, wherein the processor characterizes content of the recorded item using linguistic tools and wherein the processor generates a historical linguistic user profile for each user comprising a list of terms extracted from user recorded items and frequency of occurrence of such extracted terms and wherein the processor generates a current linguistic user profile for each user comprising a list of terms extracted from user recorded items with terms being weighted by a damping coefficient,  $e^{-\alpha t}$ , where  $t = \text{today} - \text{timestamp}$  of association of the recorded item with the user and  $\alpha$  is a damping coefficient.

13. The system of claim 4, wherein the processor determines an action based user similarity by correlating the number of user implicit ratings in the user's profile to the total number of recorded item implicit ratings stored in the memory.

5 14. The system of claim 4, wherein the processor characterizes content of the recorded item using linguistic tools, wherein the processor generates a linguistic user profile for each user comprising a list of terms extracted from user recorded items and frequency of occurrence of such extracted terms, and wherein the processor determines an overlap between a user's linguistic profile and a recorded item's linguistic content characterization.

10 15. The system of claim 1, wherein the device is selected from the group consisting of a printer, a copier, a scanner and a multi-function device for printing, scanning and copying.

15 16. A method for generating recommendations, comprising:  
providing a user request for recording an item on a hardcopy medium;  
storing an implicit rating of the requested item;  
determining whether, based on the implicit rating and recommendation criteria, to generate an item recommendation;  
20 if the criteria for generating a recommendation is met, generating a recommendation of a new item.

25 17. The method of claim 16, wherein the recording is selected from the functions of printing, scanning and copying.

18. The method of claim 16, further comprising storing user profiles for users providing user requests, wherein each user profile includes a set of user preferences pertaining to items and further comprising, updating the requesting user's profile with the implicit rating.

19. The method of claim 16, further comprising storing a representation of the recorded item in a memory.

20. The method of claim 19, wherein the representation is selected from the group consisting of a representation of the entire recorded item, a thumbnail image of the recorded item, a set of item attributes and a characterization of the recorded item's content.

21. The method of claim 18, further comprising storing a representation of the recorded item in memory and determining an item similarity for the recorded item.

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22. The method of claim 18, further comprising storing a representation of the recorded item in memory and comparing the stored representation of the recorded item with stored representations of other recorded items.

15 23. The method of claim 18, further comprising storing a representation of the recorded item in memory and comparing the stored representations of the user's recorded items with the stored representations of other recorded items.

20 24. The system of claim 18, further comprising determining a user to user similarity for the user by comparing the user's profile with the other stored user profiles.

25 25. The method of claim 18, further comprising calculating an item similarities rating between two recorded items by calculating a sum of weights of keywords in common divided by a sum of weights of all keywords associated with the two recorded items.

26. The method of claim 18, further comprising updating the user profile for each item provided by the user.

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27. The method of claim 18, further comprising:  
30 characterizing content of the recorded item using linguistic tools;

generating a historical linguistic user profile for each user comprising a list of terms extracted from user recorded items and frequency of occurrence of such extracted terms; and generating a current linguistic user profile for each user comprising a list of terms extracted from user recorded items with terms being weighted by a damping coefficient,  $e^{-\alpha t}$ ,  
5 where  $t = \text{today} - \text{timestamp}$  of association of the recorded item with the user and  $\alpha$  is the damping coefficient.

28. The method of claim 18, further comprising:

10 determining an action based user similarity rating by correlating the number of user provided items in the user's profile to the total number of recorded item representations stored in the memory.

29. The method of claim 18, further comprising:

15 characterizing content of the recorded item using linguistic tools; generating a linguistic user profile for each user comprising a list of terms extracted from user recorded items and frequency of occurrence of such extracted terms; and determining an overlap between a user's linguistic profile and a recorded item's linguistic content characterization.

20 30. A knowledge management system, comprising:

a device, responsive to a user request, for recording a requested item on a hardcopy medium;  
25 a knowledge management service located on a distributed network remote from the device for providing services associated with items in the system comprising: a repository and a processor, wherein for each item requested to be recorded, the knowledge management service stores an electronic copy of the recorded item in the repository, generates and stores a record of the user request with the requested item in the repository and associates a service with the requested item; and an input device for requesting services associated with items on the system.

31. The knowledge management system of claim 30, wherein the device comprises a printer and the device and the input device are connected to the knowledge management service via the Internet.

5 32. The knowledge management system of claim 30, wherein the services associated with items comprise content extraction and indexing.

10 33. The knowledge management system of claim 30, wherein the services comprise recommendations.

15 34. The knowledge management system of claim 30, wherein the device comprises a multi-function device for printing, scanning and copying items.

20 35. The knowledge management system of claim 30, wherein the knowledge management service comprises a recommender service for storing ratings of items and for generating recommendations for new items based on recommendation criteria;

wherein, responsive to the user request, the recommendation service stores an implicit rating for the requested item, determines whether, based on the implicit rating and the recommendation criteria, to generate an item recommendation, and if the criteria for generating a recommendation is met, generates a recommendation of a new item.

25 36. The knowledge management system of claim 35, wherein the recommender service further stores user profiles for use in generating recommendations.